

SUBCHAPTER 2.6

PALEONTOLOGICAL RESOURCES

2.6 Paleontology

A Geotechnical Investigation was prepared for the Project by Western Soil and Foundation Engineering, Inc. This study, along with other applicable data, is summarized in the following analysis, with the complete Geotechnical Investigation included as Appendix M of this EIR.

2.6.1 Existing Conditions

Paleontology is the science dealing with prehistoric plant and non-human animal life. Paleontological resources (or fossils) typically encompass the remains or traces of hard and resistant materials such as bones, teeth or shells, although plant materials and occasionally less resistant remains (e.g., tissue or feathers) can also be preserved. The formation of fossils typically involves the rapid burial of plant or animal remains and the formation of casts, molds or impressions in the associated sediment (which subsequently becomes sedimentary rock). Because of this, the potential for fossil remains in a given geologic formation can be predicted based on known fossil occurrences from similar (or correlated) geologic formations in other locations. Accordingly, while there are no recorded fossil occurrences or collection efforts known from the Project site, paleontological resource potential can be inferred from on-site geology and off-site fossil occurrences in similar materials, as outlined below.

Based on the referenced Geotechnical Investigation, geologic formations and surficial deposits observed within the Project site and vicinity are described below in order of increasing age. This discussion is followed by assessments of paleontological resource sensitivity and potential Project impacts, with additional description of site geology provided in Appendix M. Native topsoils and human-derived deposits such as fill are not included in the following analysis, due to their recent age and/or high-energy (e.g., volcanic) depositional history, and the associated lack of potential to contain fossil resources.

2.6.1.1 Stratigraphy

Surficial materials and geologic formations observed or expected to occur within the Project site and vicinity include Quaternary-age (between approximately 11,000 and 2 million years old) alluvial and colluvial deposits, Cretaceous-age (between approximately 65 and 145 million years old) igneous intrusive rocks, and the Cretaceous/Jurassic-age (between approximately 145 and 200 million years old) Santiago Peak Volcanics.

Quaternary Alluvium and Colluvium

Alluvial deposits occur in larger on-site drainages, and generally consist of unconsolidated sandy silt with angular cobble- and pebble-size grains derived primarily from metamorphic rock. Colluvial materials within the Project site consist of reworked soil and slope wash deposits, as well as some *in situ* soil materials such as decomposed granite. These materials occur in association with parent bedrock materials and are typically present in locations such as the base of larger outcrops and rocky slopes. The composition of colluvial deposit generally reflects the parent bedrock material, with colluvium derived from metamorphic rocks consisting of sandy to clayey silt with angular pebbles and cobbles, and materials derived from granitic rocks composed of silty fine- to medium-grained sands (Appendix M).

Cretaceous Granitic Rocks

Granitic rocks observed during the Project Geotechnical Investigation consist of fine- to medium-grained, variably weathered tonalite¹, with these rocks occurring primarily in the central and west-central portions of the site.

Jurassic Santiago Peak Volcanics

The Santiago Peak Volcanics were observed in much of the northern, eastern and southern portions of the Project site, and likely underlie the entire property at depth. These rocks consist generally of metamorphosed, very hard, and locally fractured volcanic and volcanoclastic² units.

2.6.1.2 Paleontological Resource Sensitivity

Each of the above units has been evaluated for paleontological resource potential and assigned a sensitivity rating, based on the following criteria derived from sources including the County of San Diego Guidelines for Determining Significance – Paleontological Resources (January 15, 2009), and Paleontological Resources, County of San Diego (Deméré and Walsh 1993).

- High Sensitivity - High resource sensitivity is assigned to geologic formations known to contain paleontological localities with rare, well preserved, critical fossil materials for stratigraphic or paleoenvironmental interpretation, and fossils providing important information about the paleoclimatic, paleobiological and/or evolutionary history of animal and plant groups.
- Moderate Sensitivity - Moderate resource sensitivity is assigned to geologic formations known to contain paleontological localities, and judged to have a strong but often unproven potential for producing unique fossil remains.
- Marginal Resource Sensitivity - Marginal resource sensitivity is assigned to geologic formations that are composed either of volcanoclastic or metamorphosed sedimentary (metasedimentary) rocks, but that nevertheless have a limited probability for producing fossils from certain formations at localized outcrops.
- Low Sensitivity - Low resource sensitivity is assigned to geologic formations that, based on their relatively young age and/or high-energy depositional history, are judged unlikely to produce unique fossil remains (although important paleontological resources have occurred infrequently in local low sensitivity deposits).
- No Sensitivity - This designation is assigned to geologic formations that are composed entirely of volcanic or plutonic igneous rocks formed from molten material, such as basalt or granite, and therefore do not have any potential for producing fossil remains.

Based on the above descriptions, the following paleontological resource sensitivity ratings are assigned to surficial and geologic units with the Project site: (1) Quaternary alluvial and colluvial deposits are assigned a “low” resource sensitivity rating due to their relatively young age and high-energy depositional

¹ Tonalite is generally defined to include igneous intrusive rocks with felsic composition (i.e., enriched in lighter elements such as silicon and oxygen) and phaneritic texture (i.e., with grains large enough to be viewed with the unaided eye). Typical compositional characteristics of tonalite include more than 20 percent quartz and less than 10 percent alkali feldspar.

² Volcanoclastic rocks consist of sedimentary or metasedimentary units derived from the erosion and redeposition of volcanic materials.

history; (2) Cretaceous granitic rocks are assigned a “no” sensitivity rating due to their molten origin; and (3) the volcanoclastic units of the Jurassic Santiago Peak Volcanics are assigned a “marginal” sensitivity rating due to known (albeit infrequent) occurrences of important fossils within these strata at off-site locations, while the volcanic and metavolcanic units are assigned a no sensitivity rating based on their molten origin.

2.6.2 Analysis of Project Effects and Determination as to Significance

2.6.2.1 Guideline for Determining Significance

Impacts to paleontological resources would be significant if the project proposes activities directly or indirectly damaging to a unique paleontological resource or site. This may occur if:

- Project-related grading or excavation would disturb the substratum or parent material below the major soil horizons in any paleontologically sensitive area of the County.

This guideline is based on the County’s Guidelines for Determining Significance – Paleontological Resources (January 15, 2009).

2.6.2.2 Analysis

Earthwork for the Proposed Project would include approximately 322,000 cubic yards of balanced cut and fill. Associated excavation and grading would be anticipated to encounter all of the described on-site surficial and geologic units, including those identified as exhibiting marginal paleontological resource potential (i.e., volcanoclastic units of the Santiago Peak Volcanics). Specifically, the Santiago Peak Volcanics were encountered at depths of approximately one to five feet in much of the site during exploratory excavations conducted as part of the Project Geotechnical Investigation (Appendix M). Based on the described marginal sensitivity rating for volcanoclastic units, implementation of the Proposed Project could potentially result in **significant impacts** to paleontological resources from excavation in previously undisturbed deposits of the Santiago Peak Volcanics. **(Impact PAL-1)**

2.6.3 Cumulative Impact Analysis

The geologic units that occur under the Project site also are present in many other areas of the San Diego region. Development of the San Diego region has resulted in disturbance to these geologic units and the fossils that they contain. Development has also, however, led to the discovery of many fossil sites that have been documented and which have added to the natural history record of the region. Development of the San Diego area will continue and will have the potential to continue to disturb these geologic units. Because of the geographic extent of the potential impacts, development of a cumulative project list for this topic is not practical.

As described in Sections 2.6.2 and 2.6.5, paleontological impacts associated with the Proposed Project are potentially significant, but would be fully mitigated through conformance with applicable regulatory requirements. Specifically, such conformance would entail implementing mitigation measures to monitor applicable Project grading and excavation operations and, if appropriate, evaluate, recover, document and curate paleontological resources. Accordingly, implementation of the described mitigation measures would ensure that important scientific information associated with on-site paleontological resources is protected and preserved. This could yield additional information or reinforce existing knowledge of local natural history. The identified cumulative projects listed in Table 1-2 (as well as others throughout the region) would be subject to similar requirements for paleontological resources, pursuant to CEQA and County requirements. If any additional development projects result in potential impacts to paleontological resources, they also would be subject to associated regulatory requirements. The described requirements for regulatory conformance would ensure that paleontological resources and associated scientific data from cumulative project sites (including the Proposed Project) would be appropriately protected and preserved. Accordingly, the Proposed

Project would not result in a significant contribution to cumulative impacts for the issue of paleontological resources and impacts would be **less than significant**.

2.6.4 Significance of Impacts Prior to Mitigation

Impact PAL-1 The Proposed Project could result in significant impacts to paleontological resources from the excavation of previously undisturbed deposits exhibiting marginal resource potential (i.e., volcanoclastic units of the Santiago Peak Volcanics).

2.6.5 Mitigation

The following mitigation measure would reduce potentially significant paleontological resources impacts to less than significant levels.

M-PAL-1 Prior to the approval of any plans, issuance of any permit, and approval of any final map(s), evidence shall be provided to the satisfaction of the Director of DPW that “Specific Environmental Notes” have been placed on the grading and/or improvement plans. These notes shall specify that if fossils greater than 12 inches are discovered, grading shall be terminated; if any paleontological resources are discovered, necessary monitoring, recovery and subsequent work shall be completed by or under the supervision of a Qualified Paleontologist; and if no paleontological resources are discovered, a “No Fossils Found” letter shall be prepared. Refer to M-PAL-1 in Chapter 7.0 for the complete mitigation measure.

2.6.6 Conclusion

Implementation of the Proposed Project would potentially result in significant impacts to paleontological resources in association with proposed grading and excavation in previously undisturbed areas exhibiting marginal sensitivity. With implementation of the above mitigation, the described impacts to sensitive paleontological resources would be reduced below a level of significance because the fossils would be removed from the site and research and curation completed as necessary and appropriate.